Vari Mu II

When switching on the unit there is a delay of about 30 seconds before the high voltage supplies turn on. Warm up time is 15-30 minutes, after which the characteristics of gain and compression don't change much anymore.

Since the unit runs quite hot, always provide some free space around it for good air circulation.

MS codecs

These work with combining input and output transformer windings. No extra electronics is switched on the signal path. Since the impedances change a bit, there is about 0,5dB level loss when switching the unit into MS modes. The codecs work along this “math”

Input:

M=(L+R) / 2

S=(L-R) / 2

Output:

L=(M+S)

R=(M-S)

This way the level inside the compressor stays the same for M-channel as for mono material. This is smart because most program material has maximum level content in the center.

There is an automatic S-channel threshold level switcher, which is activated when input MS codec is switched on. This lowers the values by 8dB, because S channel level is usually quite low. If this function is not desired, there is a jumper wire on the lower left side on the main board which can be cut.

Input and output levels

These are ladder attenuators. They are located immediately after input XLR and before output XLR. Therefore they will work outside MS codecs. Because of this, there is an “R/S trim” provided to alter the MS balance if needed. It works after compression tubes, before output stage.

Time constants

The **release times** are:

33 ms

47 ms

68 ms

100 ms

150 ms

220 ms

330 ms

470 ms

680 ms

1000 ms

1500 ms

Attack is always proportional to primary release. The slowest is 50% of chosen release time and the fastest is super fast. Each position is always 2 times faster than the next one.

Dual release mimics the memory effects in opto compression or the multiple release modes in a Fairchild. You can add a second, slower (nominally 1 or 2 seconds) slope to a faster release (any of the main release positions). This second slope needs some time to ”charge” therefore it sort of has a memory of the music: The longer and deeper compression events have been, the more the second slow slope is activated. it is sort of primitive volume automation.

Partial positions in the **link** are just that, partial linkage, but with a time dependent performance: attack periods will be linked a bit less than the release periods. Experiment, you may tweak stereo field with it if there are very loud panned transients.

Ratio is proportional to signal level and threshold position and there is also a soft knee area. Therefore it would not make sense to give any numbers for the ratio positions. As a rule of thumb, in real life use, position 6 is almost limiting, about 10:1 and position 1 is about 1.5:1 with low thresholds.

Trimming procedures

There are gain trimmers **inside** the compressor, near the ECC88 tubes. There are also **compression trimmers** (“compression balance”) and two trimmers which affect the meter scalings. These should normally not need adjusting. **Tube balance** and **meter zero** trimmers are **on the front panel**.

Tube balance is adjusted if there is side chain feedthrough, ”thumping”. Switch on the balance adjustment lever from the back panel. Then minimize the 100Hz (or 120Hz) hum that can be heard (or measured at DAW) by adjusting the **front panel** balance trimmers. The level will be around -30dBu probably (About -50 dB FSD), sometimes much lower if tubes are in very good balance. And finally switch of the balance adj from back panel.

Gain trimming is simple. Run a sine wave through the unit and adjust. Tube balance adjustment is recommended before gain adjustment. Gain trimming is recommended before compression balance trimming.

Compression balance trimming is done with link fully on, after first trimming the tube balance and gain balance. Check balance at a couple of points, for example at 3dB and 6 dBs of GR, and adjust one trimmer only to bring the compression to a good balance. Perfection is not possible, but well matched tube sets will achieve matching within 0,1dB down to 5dB GR and within 0,3dB to 10dB GR. (My limits when choosing tubes and calibrating new units)

Meter zeros adjustment is simple.

Fine adjustment of the **needle scalings** (not easy):

First turn the scaling trimmers totally CCW. These are inside the compressor. Then zero the meters from ”meter zeros” from front.

Compress 5-6dB. Then balance the needles from ”meter zero”, not from scaling. Adjust the needle which is showing more GR to agree with the another.

Release compression, and the same needle will go past zero. Now adjust ”scaling” for it. It takes quite a lot of turns to make it affect the needle.

Tubes

Compression tubes: 4 pieces ECC189 or 6ES8 or CV5331. Tubes should be a matched set.

Output amplifier: 2 pieces ECC88 + 2 pieces 6H30Pi. Note that the output stage can be modified for ECC99 too. Requires resistor and jumper changes. The earliest units of Vari Mu II used NOS ECC182 / 7119 as output tubes instead of 6H30Pi. These are still available but getting a bit more expensive all the time, thus the later units use modern manufacture 6H30Pi and have the ECC99 option.

2 pieces 12AL5 for side chain rectifier, from 2018 2 pieces of 6AL5

It is difficult to know when exactly tubes will be too old. Keep adjusting the tube balance every now and then, perhaps twice a year, and check how the gain of the unit changes. When good balance is no more possible (the test signal remains higher than about -40 dBFS) or the gain of the unit starts to go lower and lower and impossible to match or the sound is clearly muddy and distorted, then it is time to change. Tubes can also become noisy or microphonic. So, in order to know when tubes start to be at the end of their life or perform badly, you should get to know how the unit behaves now and perhaps even write down the values of test signal and gains.

Some specifications

Input impedance	5k
Output impedance	ca. 200 Ohms
Maximum output level (when output is set to “0”)	25 dBu
Noise level	-96 dBu A-weighted
Frequency response, -1dB points	15Hz and 45kHz

(Output impedance depends somewhat on output level trims and MS output codec)

(due to lower inductance the amorphous core output transformers loose a bit low end, -1dB is @ 20Hz with them)

Typical faults

Vari Mu II has been a solid performer. How ever, two things seem to be possible:

Output tube short circuit: Unfortunately 6H30Pi tubes sometimes short circuit. This will cause a fuse on the power supply PCB to trip, but unfortunately sometimes also a 0,6W resistor near the tube to burn. Luckily the resistor is easy to change from the top side of the PCB and takes little time only for any technician. How ever, because this still is a suboptimal situation, units from 2017 have 1) two more fuses, one for each channel and 2) 2W resistors in order to avoid the resistor burn.

A couple of times a fuse on the power supply PCB seems to have tripped just from getting old. This is fairly uncommon how ever. Keep fuses around. Slow blow 125mA, 160mA, 200mA, 250mA etc.

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